PB81-217697

Test of a Double-Deck Vibrating Screen Employed as an Aluminum and Glass Concentrator Test No. 5.07, Recovery 1, New Orleans

National Center for Resource Recovery, Inc.
Washington, DC

Prepared for

Municipal Environmental Research Lab.
Cincinnati, OH

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TEST OF A DOUBLE-DECK VIBRATING SCREEN EMPLOYED AS AN ALUMINUM AND GLASS CONCENTRATOR

Test No. 5.07, Recovery 1, New Orleans

by

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National Center for Resource Recovery, Inc.
Washington, D.C. 20036

Contract No. 68-01-4423

Project Officer

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16. ABSTRACT

This report documents a performance test, at nominal design conditions, of the double-deck vibrating screen at Recovery 1 that separates the "heavies" from air classification of scalped primary trommel unders into an overs stream that is discarded, a middlings stream that is the feedstock for the aluminum recovery submodule and an unders stream that is the feedstock for the glass recovery submodule.

Three test runs were conducted at the nominal design throughput capacity of the primary trommel, 62.5 tph. Samples of the three output streams from the double-deck vibrating screen were analyzed for bulk density, moisture content, particle size, and composition; screening efficiencies, by refuse component, were determined.

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FOREWORD

The Environmental Protection Agency was created because of increasing public and government concern about the dangers of pollution to the health and welfare of the American people. Noxious air, foul water, and spoiled land are tragic testimony to the deterioration of our natural environment. The complexity of that environment and the interplay between its components require a concentrated and integrated attack on the problem.

Research and development is that necessary first step in problem solution, and it involves defining the problem, measuring its impact, and searching for solutions. The Municipal Environmental Research Laboratory develops new and improved technology and systems for the prevention, treatment, and management of wastewater and solid and hazardous waste pollutant discharges from municipal and community sources, for the preservation and treatment of public drinking water supplies, and to minimize the adverse economic, social, health, and aesthetic effects of pollution. This publication is one of the products of that research, a most vital communications link between the researcher and the user community.

This report documents a performance test at nominal design conditions of the double-deck (5" circular hole top deck and 2" square hold bottom deck) vibrating screen that separates its feed, i.e., heavy fraction from air classifying magnetically scalped primary trommel unders, into an overs fraction that is discarded, a middlings fraction that is sent to the aluminum recovery system, and an unders fraction that is sent to the glass recovery system at the New Orleans resource recovery project, Recovery 1. Efficient concentration of aluminum into the middlings fraction and glass into the unders fraction by the vibrating screen is important for the quantity and quality of the aluminum and glass recovered. It is hoped that this report yields data useful to those considering the use of vibrating screens at materials recovery plants.

Francis T. Mayo
Director
Municipal Environmental
Research Laboratory

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ABSTRACT

This report documents a performance test, at nominal design conditions, of the double-deck vibrating screen at Recovery 1 that separates the "heavies" from air classification of scalped primary trommel unders into an overs stream that is discarded, a middlings stream that is the feedstock for the aluminum recovery submodule and an unders stream that is the feedstock for the glass recovery submodule.

Three test runs were conducted at the nominal design throughput capacity of the primary trommel, 62.5 tph. Samples of the three output streams from the double-deck vibrating screen were analyzed for bulk density, moisture content, particle size, and composition; screening efficiencies, by refuse component, were determined.

The report details the results of the three test runs and describes the double-deck vibrating screen, its associated equipment, and test and analytical procedures used.

This report was submitted in partial fulfillment of Contract No. 68-01-4423 by the National Center for Resource Recovery, Inc., under the sponsorship of the U. S. Environmental Protection Agency and covers a period from August 14, 1979 to December 5, 1979, with data analysis and reporting completed as of January 1980.

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SECTION 1

INTRODUCTION AND SUMMARY OF TEST RESULTS

INTRODUCTION

Municipal solid waste (MSW) received at Recovery 1 is fed into a trommel (rotary screen) as a first processing step. The fraction of the feed that passes through the 4-3/4" circular holes of the trommel, the trommel underflow, contains most of the steel and aluminum cans as well as the glass that is in the MSW. The trommel underflow is magnetically scalped to remove and recover the magnetic metals, then air classified, which further concentrates the recoverable aluminum and glass. This concentrate, which is the air classifier heavy fraction, is conveyed to a double-deck vibrating screen (Equipment #517) which exploits the size difference between aluminum canstock and glass to separate, as well as to further concentrate the aluminum and glass into feedstocks for their respective recovery submodules.

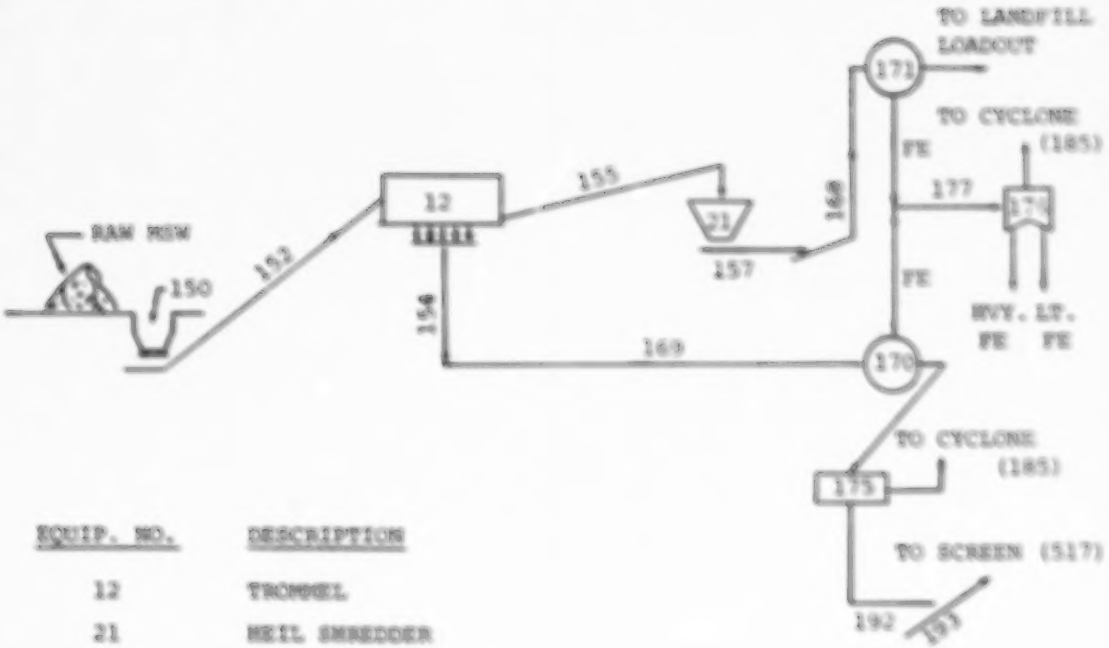
Recovery 1 Processing Screens

Figure 1 is a flow schematic of Recovery 1 processing upstream of this vibrating screen and is called the aluminum/glass feedstock concentrating screen. This device is a double-deck screen which, as tested, had a 5" circular opening punched-plate top deck and a 2" square opening wire-cloth bottom deck. The three output streams are:

(1) screen overs or the material that is retained and discharged from the top deck, which is mainly paper, plastic, sticks, etc., and therefore discarded;

(2) screen middlings or the material that passes through the 5" circular openings of the top deck but is retained and discharged from the bottom deck, which contains most of the aluminum cans and is the feedstock to the aluminum recovery submodule; and

(3) screen unders or the material that passes through the 2" square openings of the bottom deck which contains most of the glass and is



EQUIP. NO.	DESCRIPTION
12	TROMMEL
21	HEIL SHREDDER
150	PIT NO. 1 CONVEYOR
152	TROMMEL INFEED CONVEYOR
154	TROMMEL UNDERS DISCHARGE CONVEYOR
155	TROMMEL OVERS DISCHARGE/ HEIL SHREDDER INFEED CONVEYOR
157	HEIL SHREDDER DISCHARGE CONVEYOR
168	SHREDDED TROMMEL OVERS MDS FEED CONVEYOR
169	TROMMEL UNDERS MDS FEED CONVEYOR
170	TROMMEL UNDERS MDS
171	SHREDDED TROMMEL OVERS MDS
175	TROMMEL UNDERS AIR CLASSIFIER
176	FERROUS CONCENTRATOR
177	FERROUS CONCENTRATOR FEED CONVEYOR
192	AIR CLASSIFIER HEAVIES DISCHARGE CONVEYOR
193	DOUBLE-DECK SCREEN (#517) FEED CONVEYOR

Figure 1. Schematic of Recovery 1 processing through magnetics recovery and air classification.

the feedstock to the glass recovery submodule.

Effective performance of the double-deck screen would be characterized by the reporting of bulky and troublesome (to materials-handling equipment) material to the screen overs, while passing a large majority of the recoverable aluminum canstock and glass, and efficient screening of glass by the bottom deck, while passing little of the recoverable aluminum. A number of combinations of screen decks have been installed on the double-deck screen before the current 5" circular opening punched-plate top deck and 2" square opening wire-cloth bottom deck configuration. Table 1 lists these previous and the current configuration and the principal relative advantages and disadvantages of each.

Double-Deck Vibrating Screen

This report describes a test (No. 5.07) of the double-deck vibrating screen in the current configuration and at nominal design conditions, i.e., the mass flow rate of MSW into the trommel at 62.5 tph. The main objective of the test was to determine the effectiveness of the screen as a concentrator of recoverable aluminum (canstock) and glass into their respective separate streams; specifically, to obtain the mass splits (mass balance) and screening efficiencies at each deck for both the entire mass presented and specific components, i.e., recoverables (aluminum and glass), materials which can interfere with recovery (ferrous metals, other nonferrous metals, and stones and ceramics), and organic or combustible materials. To this end, three replicate concurrent samplings of each of the screen's output streams were executed, followed by sample analysis for bulk density, moisture content, composition, and particle-size distribution.

SUMMARY OF TEST RESULTS

As an aluminum concentrator, the top deck of the screen performed satisfactorily, as 97% of the aluminum cans correctly reported to the middlings which is the feedstock for the aluminum recovery submodule. In this submodule, the device that actually removes the aluminum is an eddy current separator, called an Al Mag. An inhibiting factor, as far as the performance of the Al Mag is concerned, is the amount of large, flexible organics in its feed, for example, textiles of various sorts such as panty hose; paper products, such as damp paper towels; composites, such as disposable diapers; and plastics, such as bread wrappers. In various ways, this material hinders or blocks the extraction of aluminum cans. In at least one dimension, most of this material is over 5". Unfortunately, while the top deck of the screen passed 97% of the aluminum

TABLE 1. CHRONOLOGICAL HISTORY OF CHANGES MADE TO SCREEN

DATE CHANGED	TOP DECK	BOTTOM DECK	BLINDING	PERFORMANCE SCREENING EFFICIENCY FOR AL CANS	REMARKS
3/1/78 (original)	4-1/4" W x 8" L opening rod deck of 1/4" Ø rods		severe; moderately difficult to clean	unknown	allowed many large items to pass
3/1/78 (original)		2" W x 8" L opening woven of 5/8" Ø wire	moderate; moderately difficult to clean	-	Al cans wedged in openings
3/14/78	4" square opening unwoven of 3/8" Ø rebar		severe and more rapid; more difficult to clean	79% @ 154 lb/hr Al cans fed (avg. of 22 measurements)	reduced passage of large items
4/13/78		1-15/16" square opening unwoven of 0.082" Ø rod	moderate but more rapid; moderately difficult to clean	-	no wedging of Al cans; rods broke frequently
2/12/79	4" Ø punched plate on 4-3/8" staggered centers		severe but less rapid; more easily cleaned	67% @ 154 lb/hr Al cans fed (avg. of 35 measurements)	Al cans often bounced quickly down deck

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TABLE 1 (continued)

DATE CHANGED	TOP DECK	BOTTOM DECK	BLINDING	PERFORMANCE SCREENING EFFICIENCY FOR AL CANS	REMARKS
6/12/79		2" square opening woven of 0.135" ø wire	moderate/ severe & more rapid; difficult to clean	-	wires had longer life before breaking
7/9/79	5" ø punched plate on 5-3/8" staggered centers		slightly less severe; more easily cleaned	96% @ 234 lb/hr Al cans fed (Test #5.07)	increased passage of large items

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cans, it also passed large amounts of this type of contaminant, since by virtue of their flexible nature, these pieces work their way through the 5" holes. This type of contaminant is not identified in the data since, by definition, material that passed through the 5" holes was -5". Clearly then, the data gathered do not tell the whole story as far as the effectiveness of the top deck of the screen is concerned. In actual practice, the top deck accomplishes little more, in terms of preparing feedstock for the aluminum submodule, than removal of relatively large and inflexible items. It does not retain and remove a significant proportion of the large flexibles while accommodating the passage of a high percentage of the aluminum cans. When 4" ϕ holes were tried during test runs prior to those reported here, the aluminum can loss, i.e., those cans that did not go through the 4" holes, was on the order of 30%. Finally, in practice, this top screen deck is subject to blinding by flexible organics and requires frequent removal of the accumulated material to maintain the performance observed in this test.

The bottom deck of the screen is also expected to perform a function in the preparation of the aluminum recovery submodule feedstock, the middlings. This function is to remove -2" material. Only on rare occasions is there an aluminum can that has been compressed to the extent that it will pass through a 2" hole. The 2" screen deck performed near to expectations: post-test laboratory analysis, using a procedure described elsewhere in this report, showed that only 82.6% of the -2" material presented to the 2" bottom deck actually passed through the 2" openings in that screen compared to the 85% expected. As a proportion of the middlings, 55.4% by weight, as-received, was misreported -2" material. The concentration of the aluminum in the middlings is affected greatly by this misreporting. In the feed to the top deck, the aluminum-can concentration was 0.6% (wt clean aluminum, as-received basis). In the middling stream, with the misreporting -2", it rose to 2.3%. If all the -2" material had passed through the bottom-deck screen holes, the aluminum-can concentration in the middlings would have risen to 5.0%. Put differently, there was about twice as much, by weight, in the middlings as there would have been if the bottom deck had screened perfectly. This additional material affects the performance of several downstream unit processes prior to the Al Mag. For example, it tends to overload a bucket elevator which carries the middlings from the screen (whose performance is reported in this test report) to a second screen in the aluminum submodule.

The screen tested worked far better as a glass concentrator because practically all of the glass was -2" (99.8%). The amount carried over by the 5" deck was insignificant and only 3% of the total glass in the feedstock was lost to the middlings after having failed to pass through the bottom deck's 2" holes.

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The unders, i.e., the feedstock for the glass recovery submodule, contained 51% (wt., as-received basis) material that was not glass. Conversely, 49% (wt. clean glass, as-received basis) was glass. In part, the relatively high glass concentration was caused by the poor efficiency of the 2" deck in passing -2" organics. However, if all the -2" material in the middlings had correctly reported to the unders, the glass concentration would only have fallen to 40%.

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SECTION 2

EQUIPMENT DESCRIPTION, TEST PROCEDURE AND SAMPLE ANALYSIS METHODS

RECEIVING AND SHREDDING BUILDINGS

The arrangement of the trommel, the trommel overs shredder, and their attendant conveyors is shown in Figure 2. Detailed descriptions of the equipment appear in previous work [1,2]. In normal operation, a front-end loader places refuse from the tipping floor (receiving area) of the Receiving Building into the conveyor system, which feeds the refuse into the trommel. That portion of the refuse that does not pass through the 4-3/4" diameter holes of the trommel (trommel overs) exits the discharge end of the trommel barrel onto an inclined conveyor (#155), which then feeds the trommel overflow into the Heil shredder. The shredded trommel overs are discharged onto conveyor #168, which serves as the feed conveyor to the shredded material magnetic drum separator (MDS) #171.

That portion of the refuse that passes through the trommel holes (trommel unders) falls onto a horizontal troughed-belt conveyor (#154). Conveyor #154 transfers the trommel underflow onto an inclined troughed-belt conveyor (#169), which is oriented at 90° to #154's direction of travel. Conveyor #169 serves as the feed conveyor to the trommel underflow MDS (#170).

MAGNETICS RECOVERY/AIR CLASSIFIER PAD

Both the trommel underflow MDS (#170) and shredded material MDS (#171) are positioned at the headpulleys of conveyors #169 and #168, respectively, atop a trifurcated chute (#173.1), as shown in Figure 3. The MDS product is transferred by conveyor #177 for further processing. The magnetic recovery system is the subject of other reports. The function of the trifurcated chute is to control the flow of the MDS tailings between the landfull-loadout area and the air classifier. The air classifier (A/C), depicted in Figure 3 as No. 175.1, was manufactured by Triple/S Dynamics and rated to separate 30 tph of magnetically scalped trommel underflow [3]. The "heavy fraction" from the air classifier discharges onto the horizontal troughed-belt (#192) that transfers the heavy fraction to the inclined troughed-belt conveyor (#193) which serves as the feed conveyor

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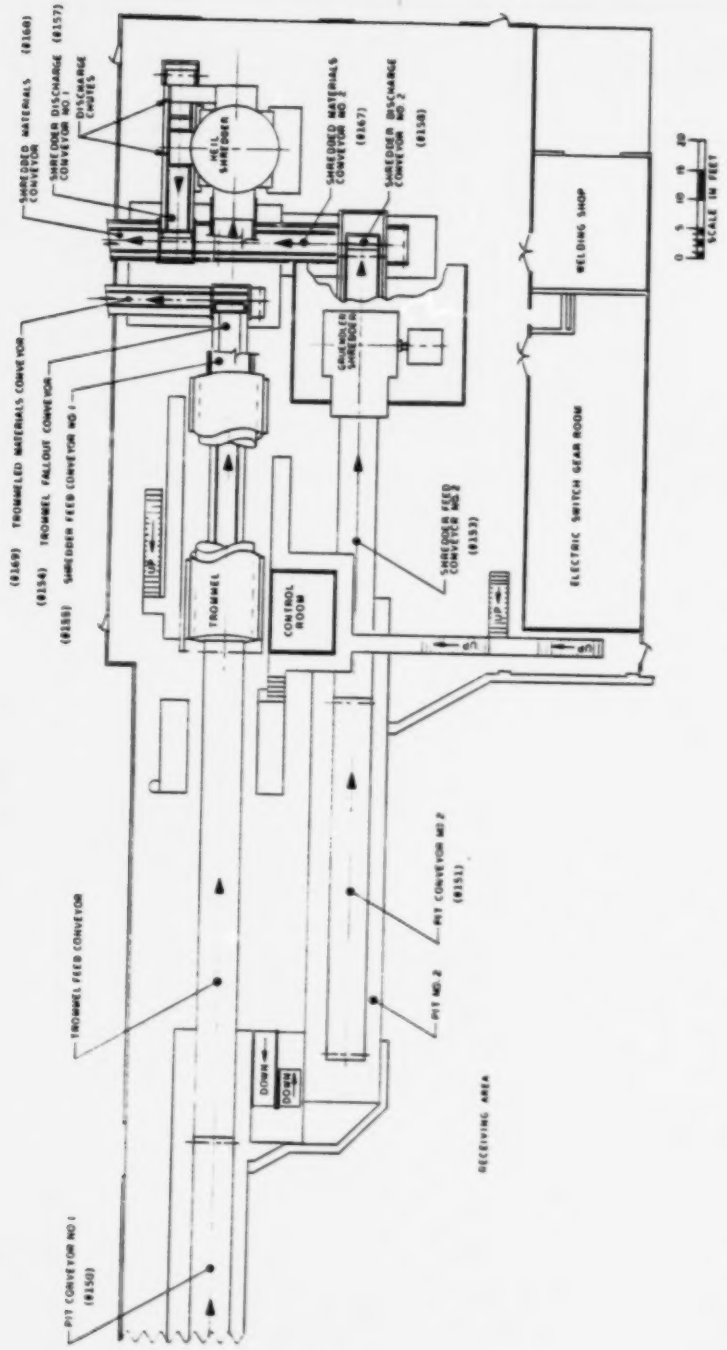

Figure 2. Receiving and shredding buildings equipment arrangement.

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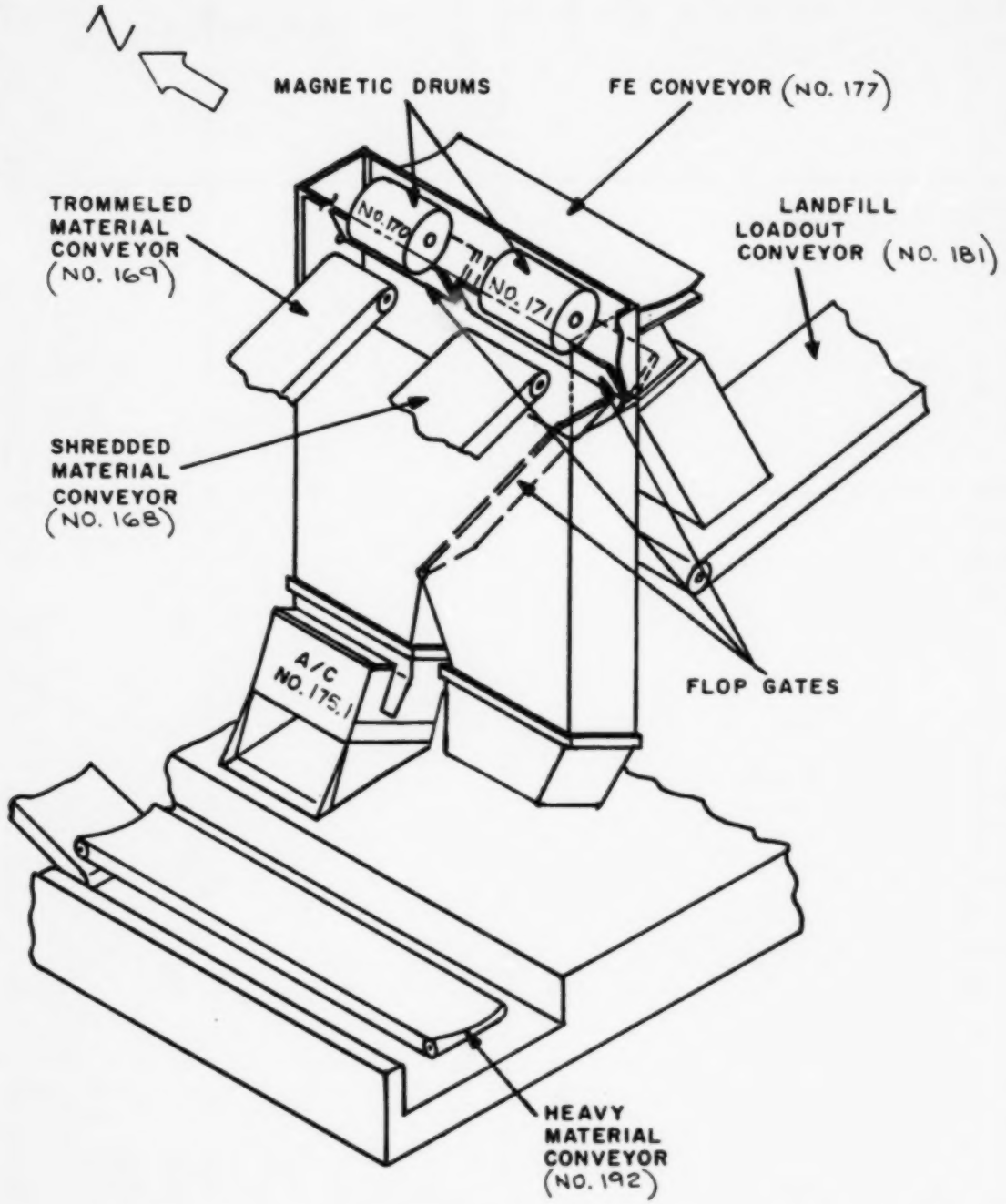

Figure 3. Trifurcated chute (No. 173.1).

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to the double-deck vibrating screen (#517). Descriptions of the feed conveyor (#193) and double-deck vibrating screen (#517) follow.

TEST EQUIPMENT DESCRIPTION

Double-Deck Vibrating Screen Feed Conveyor (193)

The feed conveyor to the double-deck vibrating screen is a 3.5 ft wide troughed-belt type (35°, three roller troughing idlers spaced at approximately four-foot intervals), approximately 121 ft long. The conveyor is inclined 20.7° above the horizontal, with its longitudinal center line oriented 7.9° from that of the double-deck vibrating screen as viewed from above. The conveyor belt is driven at a linear speed of 222 fpm by a five hp electric motor and is rated to convey 26 tph of 12 to 15 lb/ft^3 air-classifier heavy fraction.

Double-Deck Vibrating Screen (#517)

The double-deck vibrating screen is a Tyler Ty-Rock Type F-800 (Serial No. 7463), nominally six feet wide and 10 feet long. The screen was designed to process 17-1/2 tph of approximately 15 lb/ft^3 feedstock, with momentary surges to 21 tph. The screen (body and two screen decks) is declined 15° below the horizontal. The vibration is produced by a 15 hp motor which drives an eccentric rotor mounted approximately concentrically with respect to the centroidal axis of the screen. The screen vibration is characterized by a frequency of 846 cycles/min and an amplitude of 13/32 in. for a peak acceleration of 133 ft/sec^2 or 4.13 g [4]. Distribution of the feed across the screening surface is essential for an efficient screening operation. The feed distributor has two components: (1) a passive diverter located at the feed conveyor discharge chute which helps compensate for the skewness of the feed (see subsection above) and (2) an inverted "V," with six directing vanes, that is fixed to the active part of the screen and aids in distributing the feed across the screening surface.

Top Screen Deck--The top screen deck is a 1/4" thick steel plate punched with 5-in. diameter holes located on 5-3/8 in. staggered centers. There are seven rows of 21 holes and seven rows of 22 holes for a total of 301 five-inch diameter holes or 41.0 ft^2 of open screen area. The entire punched-plate screen deck is 5 ft-11-1/2 in. wide and 10 ft long for a total top deck surface area of 59.6 ft^2; therefore, the percent open area is 68.9%.

Bottom Screen Deck--The bottom deck is a 2 in. square-opening wire cloth. The wire diameter is 0.135 in. which corresponds to a percent open area of 87.8% for the wire cloth [5]. The bottom deck is 5 ft 8-3/8 in. wide (between tensioning clamps) and

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10 ft long; therefore, the total surface area of the bottom deck is 57.0 ft^2 and the open area is 50.0 ft^2.

DESCRIPTION OF TEST PROCEDURE AND SAMPLE ANALYSIS METHODS

Test Procedure

The test procedure followed in Test 5.07 is outlined below [6].

(1) Line #1 pit conveyor (#150) is set to provide an MSW mass flow rate of 62.5 tph into the trommel.

(2) When preparations are completed, the diverter in the trifurcated chute (#173.1) is fully opened so that the entire discharging stream from conveyor #169 is directed into the air classifier (#175.1).

(3) To allow startup transients in the air classifier (#175.1) and the double-deck vibrating screen (#516) to end, air-classifier heavy fraction is fed to the screen for at least two minutes before sampling.

(4) With appropriate delays (to allow passage of material through the screen's discharge chutes to the sampling points), all of the material from each of the three discharge streams of the screen is collected for 30 seconds.

(5) After sample collection, feed to the screen is ended by stopping the screen's feed conveyor (#193).

(6) The three collected samples are secured, labeled, and removed.

(7) Both top and bottom screen decks are photographed, then cleaned of accumulated material.

(8) Above steps (2) through (7) are repeated twice, for a total of three test runs.

Nominal design operating conditions for the test referred specifically to the design infeed mass flow rate into the trommel, 62.5 tph, and to the diverter position (the diverter controls the distribution of the magnetically scalped trommel underflow between landfill loadout and the air classifier) set

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to direct the entire discharging stream from conveyor #169 into the air classifier (#17 The test was conducted on Tuesday, August 14, 1979, using t s procedure described above.

To achieve the nominal design mass flow rate into the trommel and to allow near normal operation of the shredding and landfilling portion of the plant during the test, a technique of setting the Pit #1 conveyor (#150) at a specific linear speed and filling the pit to a specific consistent depth was employed. From previous nominal design condition tests [7] and other efforts to correlate trommel infeed mass flow rate with Pit #1 conveyor linear speed, it had been determined that a Pit #1 conveyor speed of four fpm with the pit filled to tipping floor level, on average, would yield a mass flow rate of approximately 62.5 tph into the trommel. Therefore, for Test #5.07, Pit #1 conveyor linear speed was set to four fpm and the front-end loader operator was instructed to fill the pit consistently to tipping floor level. All MSW processed under the above conditions before, during, and after the test runs were executed was inventoried (truck identification delivery time, and weight) by the plant weighmaster. The time that was required to feed the known quantity of MSW was obtained from an elapsed time meter that registered only when the trommel was being fed; hence, the average trommel infeed mass flow rate could be calculated.

A total of 620.8 tons of MSW was processed from the collection and transfer vehicles. The composite nominal compacted density in these trucks was 21.7 lb/ft^3. The time to process the total weight of MSW above was 662.8 minutes; therefore, the average mass flow rate into the trommel was 56.20 tph, 10% lower than the target rate of 62.5 tph. From the dimensions of Pit #1, the cross-sectional area of the pit to tipping floor level was calculated to be 30.76 ft^2. If the filling of the pit to tipping floor level was accomplished during the test, then from the pit cross-sectional area, pit conveyor speed, and the total weight and time to feed the MSW, the bulk density in the pit of the MSW processed was 15.0 lb/ft^3 (31% lower than the nominal compacted density of the MSW delivered).

Prior to test execution, times were determined for passage of material from the screen feed distributor to each of the three sampling points. The technique used was to note the time when feed material struck the feed distributor on the screen and to note the time when steady flow was observed at each of the three sampling points. At least three replicate measurements for each sampling point were used to determine the respective sampling point delay times.

Both top and bottom screen decks were cleaned before each test run. The test runs were executed with dispatch, keeping the time between test runs to a minimum. Table 2 below contains the time after feed to the screen began before sampling

commenced as well as total time of feed for each run and the time between runs. The total time required for the execution of the three test runs was approximately 1-1/2 hours.

TABLE 2. EXECUTION DATA FOR TEST RUNS

	Run No. 1	2	3
Feed Time Until Sampling Began	2-1/2 min	4 min	4-1/2 min
Total Feed Time for Run	3-1/2	5	5-1/2
Time between Runs	25-1/2	27-1/2	

SAMPLE ANALYSIS

General

Since samples of corresponding output streams from each run were analyzed similarly, descriptions of analyses for each output stream follow.

Laboratory Equipment

Laboratory equipment used during sample analyses is described in Table 3 below. In subsequent discussion of analytical procedures, equipment will be referenced using the designated equipment name only.

Sample Division

Sample division is the use of a method to divide a sample into smaller, equally representative portions. Two standard methods, cone and quartering and riffling, were used to divide primary samples (middlings and unders) and secondary samples (-1/4" size fraction from middlings and unders subsamples), respectively. These two methods and their associated equipment are essentially those described in Methods B and A, respectively, of ASTM Designation: C702-71T, "Tentative Methods for Reducing Field Samples of Aggregate to Testing Size."

For the middlings sample from each run, four subsamples were prepared by cone and quartering to obtain subsamples less than 2.5 ft^3 each. For the unders samples, eight subsamples were prepared for Run 3 and 16 subsamples for Runs 1 and 2, by cone and quartering, to obtain subsamples less than 0.5 ft^3 each. Any moisture loss that occurred during sample division of primary samples was distributed among the subsamples in the

TABLE 3. DESCRIPTIONS OF LABORATORY EQUIPMENT

Equipment Name	Description
4 ft^3 fiber drum	a fiber drum with inside dimensions: height 29.0 in., diameter 17.0 in., volume 3.82 ft^3.
1 ft^3 fiber drum	a fiber drum with inside dimensions: height 15.8 in., diameter 11.2 in., volume 0.906 ft^3.
plastic tubs	any of a group of plastic tubs with approximate inside dimensions: height 8 in., diameter 12 in.
plastic barrels	any of a group of plastic barrels with screw tops and approximate inside dimensions: height 31 in., diameter 22 in.
riffler	an open riffle-type sample splitter with 12,075 in. wide chutes
drying oven	Hot Pack model 1253 oven, forced convection, capacity 8.6 ft^3.
bench oven	Blue M model OV 12A oven, gravity convection, capacity 1 ft^3.
muffle furnace	Blue M model M15A-1A furnace, 1800° F maximum temperature, capacity 120 in^3.
testing screen	Gilson testing screen, model TS-2, screen area 2-1/3 ft^2, screen sizes 4 in., 2 in., 1 in., 1/2 in., and 1/4 in. square openings.
laboratory sieve shaker	Tyler Ro-Tap sieve shaker, model B, sieve diameter 8 in., height 2 in., openings U.S. Std. #20 and #140.
wheeled platform scale	workshop-type platform scale, capacity 500 lb, readability 1/4 lb.
platform balance	laboratory platform balance, capacity 55 kg, readability 10 g.
triple-beam balance	laboratory triple-beam balance, capacity 2.61 kg, readability 0.1 g.
vernier-beam balance	laboratory beam balance with vernier dial, capacity 310 g, readability 10 mg.

proportion of the weight of each subsample to the sum of subsample weights. For the -1/4" size fraction from middlings and unders subsamples from each run, eight subsamples were prepared by riffling to obtain subsamples of approximately 25 g and 150 g each, respectively. These subsample sizes were chosen because of limitations in drying or screening capacity or from previous work with similar material.

Bulk Density

Two types of bulk density measurements were made: loose and shaken. Loose bulk density was measured by determining the volume occupied after loading each sample or subsamples into the appropriate container (4 ft^3 fiber drum for overs samples and middlings subsamples; 1 ft^3 fiber drum for unders subsamples) without agitation. Care was taken not to allow bridging and creation of voids in underlying material. The volume occupied was computed using the average depth from four equally spaced measurements around the circumference and one at the center. After the loose depth measurements, each sample or subsample was shaken and rocked until the depth of material remained constant; the depth measurements were repeated.

Air Drying

The three overs samples were oven dried first, which eliminated the need for air drying. All middlings subsamples were placed in separate plastic drums fitted with window screen covers to permit air drying. These drums were laid down to prevent contamination from above and rolled as often as daily to expose the more moist material to the air. From the unders subsamples from each run, two were selected (those closest to the mean subsample weight) and placed in plastic tubs fitted with window screen covers. After a period of air drying it was necessary to partially oven dry at 100° to 110°C for about one day (to destroy the microorganisms that were decomposing the organics) before continuing to air dry. No regular agitation was provided for the unders subsamples.

Oven Drying

As the drying oven became available, an air-drying sample was placed into a 2.5 ft^3 stainless steel pan, weighed on the platform scale, and put into the drying oven at 100° to 110°C for four hours. The sample was weighed periodically until moisture lost was less than 0.1% of the initial sample (or subsample) wet weight.

Redrying

Because moisture was reabsorbed during various analyses that followed, it was necessary to redry those portions of the

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samples so exposed. Redrying, in general, was accomplished by heating at 100° to 100°C in either the drying or bench oven for not less than 12 hours. The decontaminated metal and glass components were redried for not less than one hour at 100° to 110°C. Depending on the weight of the sample, either the triple-beam or vernier-beam balance was used for weighing.

Coarse Screening

Oven-dried samples were coarse screened in two stages: manually for that portion greater than 1" to minimize breakage of embrittled organics and friable components, and (2) on the mechanical "testing screen" for the portion less than 1". The screen sizes used were a 5" circular opening and 4", 2", 1" 1/2", and 1/4" square openings. The criterion for passage through a given screen size in manual screening was that a particle could pass through the opening in any orientation to the opening but with no deformation. The criterion for completion of mechanical coarse screening was the visually observed end of particles passing through any screen. The mechanical coarse screening was carried out in batches, as necessary, to prevent overloading any one screen [8].

Because coarse screening was done using 5 in. round and 4" square screen openings, it was possible for some objects to pass through the square opening (which measures 5.7 in. diagonally) and not fit through the round opening. These items were categorized as +5" - 4"; they appear in Appendix A for the overs from Runs 1, 2 and 3.

Fine Screening

For the portion of the sample passing the 1/4" screen of the testing screen, all or a subsample of it was then screened on the laboratory sieve shaker which had been stacked with U. S. Standard #20 and #140 sieves. This sample material was then screened until there was less than 0.1% change (of total screened) in any size fraction per five minutes of screening. This criterion was satisfied in 20 minutes for the first unders subsample screened; this time was used for subsequent fine screenings.

Manual Sorting

Compositional analysis of sample material was accomplished by manual (hand) sorting into the following components:

Organics -- Combustible material, e.g., paper, yard waste, food waste, plastics, textiles, rubber and leather.

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Ferrous can	-- Magnetic cans of various kinds and can-related items, e.g., tops, caps, lids.
Ferrous non-can	-- Magnetic material unrelated to steel can packaging, i.e., automotive parts, pipe, hardware
Aluminum can	-- Nonmagnetic containers with aluminum as the principal alloying constituent, e.g., all aluminum beverage cans, food cans and their tops.
Aluminum and other	-- Principally aluminum items not in the aluminum can category, e.g., light- and heavy-gauge foil, pull tabs, extrusions, and castings.
Other non-ferrous (ONF)	-- Nonmagnetic metals other than aluminum as the principal alloying constituent, e.g., brass, copper, some stainless steels.
Glass	-- An inorganic, friable component found in the refuse mainly as post-consumer bottles and jars.
Stone and Ceramics	-- An inorganic component comprised of rocks, concrete, bricks, shells, etc.

Decontamination

For the recoverable components (aluminum can, aluminum - other, and glass), as well as those which can interfere with their recovery (ONF, ferrous can and non-can), the level of contamination, or the amount of non-component material contained in the component, was determined. This contamination could be organics attached to glass particles, a cigarette butt (organics) inside an aluminum can, or a plastic handle (organics) of an aluminum utensil, etc.

The methods used to decontaminate differed among components:

Ferrous can and non-can -- placed in the muffle furnace to burn off combustible contamination, washed, followed by oven drying; or manual disassembly and removal of non-ferrous material.

Aluminum can and other, ONF -- cans cut open, foil uncrumpled, others disassembled, then washed and oven dried.

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Glass -- pieces larger than 1/2" were washed by hand and/or boiled in soapy water; -1/2" +1/4" size fraction was placed in hydrochloric acid solution, then water washed and oven dried.

In every case of decontamination, the "clean" weight of the component was the measured quantity from the analysis.

Sink/Float Separation

Because of the large number and small size of the particles in the -1/4" + #20 size fraction, it was more efficient to "float" almost all of the organics from the remainder of the sample rather than hand sort it all. The flotation of organics was accomplished using a 50% (wt) aqueous zinc chloride solution (1.6 sp. gr.). The "floats" were examined for entrained glass and aluminum particles which were then removed and added to the sinks before flushing, drying, and manual sorting.

Adequacy of Sample Size

Sample analyses for this test were extremely time-consuming. Ideally, all subsamples would have been analyzed. More than a man-year of effort would have been required to accomplish this. Length of time required to analyze a subsample was not known in advance; as analyses proceeded, it became clear that there would only be time to analyze some minimum number of subsamples. The decision was made to analyze two subsamples of middlings and unders from each run. In each case, the two subsamples chosen were those with weights nearest to the average subsample weight. Using this strategy, the ranges of subsample component concentrations were determined. While several of the interfering components (ferrous can, ONF, etc.) showed large ranges, this was due in part to their low concentrations. That is, the presence or absence of a single item (say, a brass fitting) could greatly influence the range of (ONF, in this case) concentration. In the end, the analysis of two middlings and unders samples from each run was judged to be adequate except in regard to the aluminum can concentration in the middlings.

Aluminum can concentration was significantly higher than most interfering components and showed a wide range between subsamples - as much as 33% of the concentration. It was necessary to oven dry the remaining two middlings subsamples for each run and analyze only their aluminum can content. Uncertainty of aluminum can concentration, shown in Table 4, using two subsamples and using all four subsamples, was drastically reduced. This uncertainty was computed using the t-statistic. An example will illustrate. For Run 1, after analyzing two subsamples, we may say with 90% confidence that the true mean concentration of aluminum can material lies within 2.12 percentage units of the measured mean of 5.30%, i.e., anywhere between 7.42% and 3.18%.

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After analyzing four subsamples, we may say with 90% confidence that the true mean concentration of aluminum can materials lies within 0.90% percentage units of the measured mean of 4.69%; i.e., anywhere between 5.59% and 3.79%. Since all subsamples were analyzed, greater accuracy could only have been obtained by taking larger samples.

TABLE 4. UNCERTAINTY OF ALUMINUM CAN CONCENTRATION IN MIDDLINGS FRACTIONS

Run	Number of Subsamples			
	2		4	
	Mean	Uncertainty	Mean	Uncertainty
1	5.30%	2.12%	4.69%	0.90%
2	4.79	10.07	4.89	2.04
3	5.58	7.83	5.51	1.32

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SECTION 3

TEST RESULTS

TEST SUMMARY

Test Procedure

Details of test procedure are given in Section 2. Briefly, the double-deck screen was tested by sampling each output stream for 30 seconds. Three 30-second test runs, or samplings, were done. Sampling points were located either at the discharge from a screen deck or in chutes a short distance downstream of the screen. For each stream, the time for material to travel from the screen discharge to the sampling point was added to the sampling start time and stop time. This was done to assure that the samples from all three output streams corresponded to the same 30-second interval of feed to the screen.

Test Summary

The average infeed rate to the trommel for a period that included the test run executions was 56.2 tph, 10% less than the design rate. Although an effort was made to feed the trommel consistently, substantial variation in the vibrating screen's feedrate was observed; the feedrate ranged from the mean of 18.60 tph by +21.3% for the highest and to -8.0% for the lowest feedrate. The design feedrate for the screen was 17 tph (with surges to 21 tph) of 15 lb/ft^3 material. Variations in the feedrate to the trommel and/or variations in the mass split in the trommel due to inherent variability of the MSW compounded by variation in the mass split in the air classifier are probable causes for the observed variability in the feedrate. This variation will be addressed further later in the text. Although the output streams of the screen were sampled, by simply weighting the average bulk densities of the output streams by the respective fractional mass splits, an estimate of the feed bulk density is 39 lb/ft^3, considerably higher than the design estimate. The mass split (average of three test runs, wet-wt.basis) of the feed into the three output streams showed that 3.0% reported to the overs, 26.7% reported to the middlings, and 70.3% reported to the unders.

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The average screening efficiency of the top deck for the principal recoverable aluminum category, canstock, was 97.2% (air-dried wt basis). There was only a small variation in screening efficiency while the feedrate varied considerably which may indicate additional screening capacity for this deck. The average concentration of aluminum canstock in the feed was 0.63% (Al metal/wet feed) with 0.54% to 0.77% the range, while that for the middlings was 2.32% (as sampled wt. basis) with 2.20% to 2.41% the range, or a 2.7-fold increase in concentration.

Materials Balance

Table 5 shows mass flow rates in each stream, by component. The sample size is extrapolated to pounds per hour. For a given component in a given stream, four mass flow rates are given: (a) all material, with attached contaminant; (b) all material, after contaminant removed ("clean" metal or glass); (c) misreporting, i.e., undersize material, with attached contaminant; and (d) misreporting material, after contaminant removed. In the overs stream, misreporting material is any material in the -5" round, -4" +2" square and smaller sizes. In the middlings stream, misreporting material is any material in the -2" +1" and smaller sizes. For example, data related to the glass in the middlings stream are: 513 lb/hr of all material, with attached contaminant; 486 lb/hr, clean; 477 lb/hr of misreporting material with attached contaminant; 450 lb/hr of misreports, clean.

Though most material passes through the upper deck, this deck is intended to scalp large organics (e.g., corrugated paper, disposable diapers, sticks) that would otherwise interfere with processing in downstream equipment. The upper deck removes some of these items; however, a significant amount of large organics, enough to visibly interfere with aluminum recovery, passes through the 5" round holes. These are usually flexible objects, longer than 5" in one direction. On the 2" deck, both aluminum can and glass components are well screened, i.e., the ratio of misreports to total mass flow is small.

From Table 6, concentrations of the following components are greater in the middlings than in the feed: organics, ferrous can, ferrous non-can, aluminum can, aluminum-other, other non-ferrous (ONF). Concentrations of the remaining components (glass, stones and ceramics, fines) are greater in the unders than in the feed. Regarding the target materials, aluminum can concentration increases from 1% in the feed to 5% (dry basis, including contaminant) in the middlings; glass increases from 60.3% in the feed to 74.9% (dry basis, including contaminant) in the unders. Organic material interferes with aluminum recovery, and its concentration increases (largely due to misreporting) from 26.0% in the feed to 68.5% in the middlings.

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TABLE 5. MASS FLOW RATES, BY COMPONENT (lb/hr, dry)

		FEED		OVERS		MIDDLINGS		UNDERS	
		with contam	Clean	with contam	Clean	with contam	Clean	with contam	Clean
Organics	T	6543		632		3348		2563	
	M			274		1820			
Fe can	T	157	98	0		97	52	60	46
	M					24	17		
Fe non-can	T	391	98	61	1	134	22	196	76
	M			61	1	86	1		
Al can	T	254	234	7	7	243	230	3	3
	M			7	7	9	7		
Al other	T	307	171	2	1	205	119	100	51
	M			2	1	116	83		
ONF	T	99	79	tr	tr	71	58	26	22
	M			tr	tr	10	8		
Glass	T	15200	13270	15	14	512	486	14670	12780
	M			15	14	477	450		
Stones & ceramics	T	1208		5		190		1012	
	M			5		129			
-20m Fines	T	1038		1		88		949	
	M			1		88			
TOTAL	T	25200		724		4889		19580	
	M	N/A		367		2759			

T = Total
M = Misreported, included in total
N/A = Not applicable
tr = Trace

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TABLE 6. COMPOSITION OF STREAMS, BY PERCENT

Dry, with Attached Contamination

Composite of Three Runs	Feed	Overs	Middlings	Unders
Organics	26.0	87.3	68.5	13.1
Fe can	0.6	-	2.0	0.3
Fe non-can	1.6	8.4	2.7	1.0
Al can	1.0	1.0	5.0	tr
Al other	1.2	0.3	4.2	0.5
ONF	0.4	Tr	1.5	0.1
Glass	60.3	2.1	10.5	74.9
S & C	4.8	0.8	3.9	5.2
-20 mesh	4.1	0.2	1.8	4.9
Total	100.0	100.0	100.0	100.0

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Screening Efficiency

For a given component, screening efficiency is defined as the dry weight of all material passing through a screen deck, expressed as a percentage of the dry weight of undersize material presented to the deck. For components other than organics, stones and ceramics, -20 mesh fines, and the total (all components), weights of cleaned material are used to compute screening efficiency.

Table 7 shows screening efficiencies for all components for each run and the composite (weighted average) of all runs. The target materials for this recovery system, aluminum cans and glass, are both screened at greater than 96% efficiency by the 5" deck. On the 2" deck the 27.8% screening efficiency for aluminum cans results from a single -2" object not passing through that deck during Run 2. Two-inch deck screening efficiencies for aluminum cans in Runs 1 and 3 are zero because no undersize material was present in those runs. Screening efficiency for glass was quite high (greater than 96% in all cases), indicating that the 2" deck is adequately sized for glass recovery.

Of the components that interfere with aluminum recovery, organics present the greatest mass flow rate. Screening efficiency for this material is less than 70%, but an improvement in efficiency would move the organics from the aluminum-rich middlings stream to the glass-rich unders stream, where they would interfere with glass recovery.

Moisture

Table 8 shows the moisture content of the material. During screening, most moisture (in lb/hr) was carried to the unders stream, and Runs 2 and 3 were significantly higher in moisture than Run 1. From observation during sample analyses, Run 1 was markedly lower in yard waste (grass clippings, leaves) than Runs 2 and 3. The concentration of moisture was greatest in the middlings. While almost all materials easily passed through the upper deck, moisture-laden material did not pass through the lower deck as readily. There are several possible reasons for this. Organics carry most of the moisture, and most organics are greater than 1" in size. Note the increase in concentration of organics from the feed to the middlings and the large amount of misreporting organics in the middlings in Tables 8 and 9. It may be, though this cannot be determined from the data available, that large organics have a higher moisture content than do small organics. Also, the flexible nature of most organics may make them more difficult to screen. Regarding this last point, Table 9 displays the inverse relationship between screening efficiency of the 2" deck and moisture content. This relationship holds when considering organics alone (it is then

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TABLE 7. SCREENING EFFICIENCIES

	5" Deck				2" Deck			
	Run 1	Run 2	Run 3	Comp.	Run 1	Run 2	Run 3	Comp.
Organic	95.80	96.05	94.54	95.56	70.01	55.83	47.43	58.38
Fe can	100	100	100	100	52.36	80.95	79.06	71.26
Fe non-can	99.99	73.26	99.99	84.45	93.91	76.50	27.59	69.64
Al can	97.51	96.51	97.86	97.22	0	63.98	0	27.82
Al other	100	98.04	100	99.25	47.50	40.53	55.28	46.28
ONF	100	100	98.80	99.85	100	62.13	91.37	71.77
Glass	99.96	99.89	99.81	99.90	96.94	96.64	97.03	96.85
S & C	99.99	99.94	98.02	99.55	94.33	82.28	94.36	88.70
-20 mesh				99.89				91.52
Total	98.94	98.16	98.21	98.46	91.01	85.46	83.63	87.10

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TABLE 8. MOISTURE CONTENT

Run	Size	Moisture Content
1	Feed	24.4%
	Overs	34.3
	Middlings	45.9
	Unders	17.7
2	Feed	34.7
	Overs	33.0
	Middlings	51.6
	Unders	28.1
3	Feed	38.1
	Overs	39.2
	Middlings	53.8
	Unders	30.5
Composite	Feed	32.3
	Overs	35.6
	Middlings	50.8
	Unders	25.1

TABLE 9. SCREENING EFFICIENCIES VS. MOISTURE CONTENT: 2" DECK

	Organics screening efficiency	Organics moisture content	Overall screening efficiency	Overall moisture content
Run 1	70.0%	58.4%	91.0%	24.1%
Run 2	55.8	68.5	85.5	34.7
Run 3	47.4	70.2	83.6	38.1

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assumed that all moisture is contained in the organics) and when considering all material in each test run. The expected inverse relation between screening efficiency and mass flow of feed to the 2"deck (refer to Tables 5 and 6, middlings and unders) did not occur.

Bulk Density

Bulk density of each stream is shown in Table 10. For the middlings and unders, these data are composited from the weights and volumes of all subsamples. For middlings, the range of subsample bulk densities was never more than 20% of the composite; for unders, 10%.

Overs samples each consisted of relatively few (less than 100) particles; hence there is a broad range of bulk densities among the three runs. The middlings sample in Run 1 is less dense and the unders sample more dense than samples from Runs 2 and 3. The lower moisture content and greater screening efficiency observed for Run 1 may be associated with those density variations.

The initial weights and bulk density values in Table 10 include all moisture present when the samples were taken.

Particle Size Distribution

Particle size distributions (PSD's) for the feed and output streams after oven drying are shown in Table 11.

Feed to the 2" deck (designated as middlings + unders) was rich in near-size material: 44.9% was between 2" and 1/2" in size. Table 12 compares the proportion of near-size (-2" + 1/2") material in each run with the screening efficiency of the 2" deck for all material in that run. The range of variation of the percent near-size is too small to permit correlation with 2" deck screening efficiency. Variation in 2" deck screening efficiency may result from a change in some other parameter; moisture content may be the cause, as previously discussed.

Considering organics alone, Table 13 compares the percentage of near-size organics with organics screening efficiency. Here, an inverse relation is seen. Moisture may also influence the screening of organics (Table 9); the relative strengths of the two effects cannot be determined from available data.

PSD's for organics, aluminum cans and glass are presented as a composite of all three runs in Table 14. Regarding the feed to the 2" deck, we find aluminum cans with 95.1% greater than 2", glass with 93.5% less than 1", and 28.6% of the organics between 2" and 1". It is no surprise that the 2" deck effectively

TABLE 10. AS-RECEIVED BULK DENSITIES

		OVERS			MIDDLINGS			UNDERS		
		Initial wt (lb)	Volume (ft^3)	Bulk density (lb/ft^3)	Initial wt (lb)	Volume (ft^3)	Bulk density (lb/ft^3)	Initial wt (lb)	Volume (ft^3)	Bulk density (lb/ft^3)
Run 1	L	7.25	2.02	3.59	66.74	8.07	8.28	228.6	5.40	42.3
	S		1.43	5.07		6.27	10.64		4.04	56.5
Run 2	L	11.37	-	-	102.87	11.34	9.07	261.8	7.59	34.5
	S		2.42	4.71		8.08	12.73		5.63	46.5
Run 3	L	9.52	1.94	4.92	78.87	8.58	9.20	163.0	4.53	36.0
	S		1.55	6.14		6.19	12.75		3.30	49.4
Composite										
	L	28.14	-	-	248.48	27.99	8.88	653.4	17.52	37.3
	S		5.40	5.21		20.54	12.10		12.97	50.4

L = Loose. See Bulk Density, Descriptions of Sample Analyses, Section 3.

S = Shaken. " " " " " " " " ".

TABLE 11. PARTICLE SIZE DISTRIBUTION, COMPOSITE

% Dry, with Attached Contaminants

	Size Ranges	Feed	Overs	Middlings & Unders	Middlings	Unders
Composite	+5+4	1.6	47.3	0.2	1.3	0
	+5-4	0.1	2.1	0	0	0
	-4+2	9.1	29.6	8.4	42.3	tr
	-2+1	14.1	15.6	14.1	39.4	7.8
	-1+1/2	31.0	3.6	31.8	9.4	37.4
	-1/2+1/4	27.5	1.1	28.3	3.2	34.5
	-1/4+20m	12.5	0.5	12.9	2.6	15.4
	-20m	4.1	0.2	4.2	1.8	4.8

TABLE 12. SCREENING EFFICIENCY, 2" DECK VS. PERCENT NEAR-SIZE

Run	Screening Efficiency 2" deck	% near-size (-2" +1/2")
1	91.01%	46.15%
2	85.46	44.46
3	83.63	47.82

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TABLE 13. ORGANICS SCREENING EFFICIENCY, 2" DECK VS. PERCENT NEAR-SIZE

Run	Organics screening efficiency, 2" deck	Percent near-size (-2" +1/2")
1	70.01%	43.57%
2	55.83	45.27
3	47.43	48.74

separates aluminum cans from glass, and that a great many organic particles misreport (39.8% of the organics in the middlings are between 2" and 1").

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TABLE 14. PARTICLE SIZE DISTRIBUTION: ORGANICS, ALUMINUM AND GLASS

		Feed	Overs	Middlings & Unders	Middlings	Unders
			Organics (% dry)			
Composite	+5" +4"	6.19	54.18	1.06	1.87	0
	+5" -4"	0.23	2.40	0	0	0
	-4" +2"	25.46	31.71	24.80	43.78	0
	-2" +1"	26.61	8.05	28.59	39.83	13.91
	-1" +1/2"	15.67	3.07	17.01	8.94	22.56
	-1/2" +1/4"	10.65	0.30	11.76	2.69	23.61
	+1/4" +20	15.19	0.29	16.78	2.90	34.92
			Aluminum Cans (% dry, with attached contaminant)			
	+5" +4"					
	+5" -4"					
	-4" +2"	95.23	100	95.09	96.41	
	-2" +1"	4.67		4.81	3.49	100
	-1" +1/2"	0.10		0.10	0.10	
	-1/2" +1/4"					
	-1/4" +20					

(continued)

TABLE 14 (continued)

		Feed	Overs	Middlings & Unders	Middlings	Unders
		Glass (% dry, with attached contaminant)				
Composite	+5" +4"					
	+5" -4"					
	-4" +2"	0.23		0.23	6.95	
	-2" +1"	7.12	9.75	7.12	49.06	5.65
	-1" +1/2"	41.66	45.43	41.65	27.08	42.16
	-1/2" +1/4"	38.88	36.92	38.88	12.46	39.81
	-1/4" +20	12.11	7.90	12.11	4.45	12.38

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7. Bagalman, op. cit.

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APPENDIX A

Appendix A contains 21 tables summarized as follows:

Table A-1 Run 1 Overs.

Table A-2 Run 1 Middlings.

Table A-3 Run 1 Unders, Subsample 1A2B.

Table A-4 Run 1 Middlings, Subsample 1B.

Table A-5 Run 1 Unders, Subsample 1B1B.

Table A-6 Run 1 Middlings, Subsample 2A.

Table A-7 Run 1 Middlings, Subsample 2B.

Table A-8 Run 2, Overs.

Table A-9 Run 2, Middlings, Subsample 1A.

Table A-10 Run 2, Middlings, Subsample 1B.

Table A-11 Run 2, Middlings, Subsample 2A.

Table A-12 Run 2, Middlings, Subsample 2B.

Table A-13 Run 2, Unders, Subsample 1A1A.

Table A-14 Run 2, Unders, Subsample 2A1A.

Table A-15 Run 3, Overs.

Table A-16 Run 3, Middlings, Subsample 1A.

Table A-17 Run 3, Middlings, Subsample 1B.

Table A-18 Run 3, Middlings, Subsample 2A.

Table A-19 Run 3, Unders, Subsample 2A2.

Table A-20 Run 3, Middlings, Subsample 2B

Table A-21 Run 3, Unders, Subsample 2B1

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TABLE A-1. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 1

STREAM Overs

SUBSAMPLE _____ INITIAL WT. (GMS) 3287.4 OVEN DRY WT. (GMS) 2160.0

COMPONENT	Size Range (Inches) +5 +4	+5 -4*	-4 +2	-2 +1	-1 +1/2	-1/2 +1/4	-1/4+No.20	-No.20
ORGANICS	15 / 1030.9	56.6	18 / 576.5	7 / 414.1	9 / 7.1	3.3	3.60	
FE CANS								
FE, NON CAN							0.09	0.10
AL CANS			1 18.40 / 19.5					
AL, OTHER								
OTHER NON FE								
GLASS					14 21.6 / 21.6	8 4.6 / 4.6	2.48	
STONE AND CERAMIC							0.31	
TOTAL	1030.90	56.6	596.0	414.1	28.7	7.9	6.48	2.77

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

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TABLE A-2. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 1

STREAM Middlings

SUbSAMPLE 1A INITIAL WT. (GMS) 7658.9 OVEN DRY WT. (GMS) 3880.0

COMPONENT	Size Range (Inches)																	
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS	98.1				1117.8		979.6		148.9		78.5		49.61			
FE CANS							2	25.73								
							26.44									
FE, NON CAN							1	9.27	1	3.74						
							23.14		3.75				0.55			
AL CANS					12	212.7										
					218.6											
AL, OTHER					5	41.0	6	30.3					2			
					92.7		45.63						0.01			
OTHER NON FE					3	200.6										
					260.3											
GLASS							14	333.1	36	157.15	61	59.05				
							346.9		157.54		59.48		15.55			
STONE AND CERAMIC					2		2		1		13					
					62.6		45.23		5.22		6.85		1.55			
TOTAL	98.1				1752.0		1466.94		315.41		144.83		67.27		39.6	

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

TABLE A-3. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 1

STREAM Unders

SUbSAMPLE 1A2B INITIAL WT. (GMS) 6536.3 OVEN DRY WT. (GMS) 5360.0

COMPONENT	Size Range (Inches)																			
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS							122.8		173.1		169.6		245.4			
FE CANS									4	7.6						
									8.5							
FE, NON CAN											2	3.1				
											3.1		7.8			
AL CANS																
AL, OTHER							2	4.5	10	4.75	5	0.42				
							7.1		6.7		0.6		0.2			
OTHER NON FE																
GLASS							8	118.1	517	1818	2078	1671				
							125.6		1825.4		1674.7		550.6			
STONE AND CERAMIC							4		15		169					
							86.7		37.4		71.0		74.6			
TOTAL																
							342.2		2051.1		1919.0		878.6		173.2	

*Square holes. See Section 3, Coarse Screening, for explanation

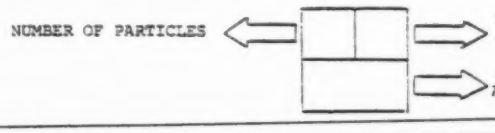

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TABLE A-4. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 1

STREAM Middlings

SUBSAMPLE 1B INITIAL WT. (GMS) 7049.4 OVEN DRY WT. (GMS) 4120.0

COMPONENT	Size Range (Inches)																	
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS		21.64				1431.2		1052.3		197.4		61.1		50.0		
FE CANS							2	11.68	1	1.38						
								12.85		1.78						
FE, NON CAN									1	0.73	1	1.23				
										2.10		1.23		0.54		
AL CANS					8	125.2	1	27.2								
						132.3		29.1								
AL, OTHER					2	18.9	7	106.6	1	0.46						
						34.8		139.3		0.76						
OTHER NON FE					1	32.6										
						35.3										
GLASS					1	57.0	13	380.2	34	128.9	82	83.3				
						57.1		381.1		129.05		83.56		19.79		
STONE AND CERAMIC					2		1		2		11					
						136.1		54.0		7.40		3.41		3.02		
TOTAL		21.64				1826.8		1668.65		338.49		149.3		73.67		40.67

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

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TABLE A-5. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 1

STREAM Unders

SUBSAMPLE 1818 INITIAL WT. (GMS) 6618.0 OVEN DRY WT. (GMS) 5460.0

COMPONENT	Size Range (Inches)																					
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS							89.77		300.24		194.48		221.77			
FE CANS									5		9.98					
										12.16						
FE, NON CAN							1	11.70	2	0.65	4	15.52				
							70.0		13.68		18.50		7.31			
AL CANS																
AL, OTHER							3	2.20	6	3.92	2	0.09				
							3.30		10.92		0.10					
OTHER NON FE																
GLASS							13	195.7	542	1814	2044	1619.1				
							206.3		1822.79		1622.62		434.65			
STONE AND CERAMIC							3		16		201					
							63.5		67.9		77.15		67.71			
TOTAL							432.87		2227.89		1912.85		731.44		150.4	

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

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TABLE A-6. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 1

STREAM Middlings

SUBSAMPLE 2A INITIAL WT. (GMS) 7592.9 OVEN DRY WT. (GMS) 4030.0

COMPONENT	Size Range (Inches)																	
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS	1															
	33.37				1575.3		882.8		200.4		60.2		68.44			
FE CANS					2	23.2	3	18.03	1	1.85						
					103.0		42.97		2.00							
FE, NON CAN					1	15.65			1	2.08						
					15.66				2.12							
AL CANS					10	177.7	1	8.82	2	1.11						
					189.5		8.90		1.16							
AL. OTHER					3	41.20	8	49.85								
					74.00		75.75									
OTHER NON FE					1	68.60										
					73.83											
GLASS					1	67.54	7	179.1	34	139.35	68	66.83				
					67.7		179.57		139.96		67.28		24.21			
STONE AND CERAMIC							1	41.92	5		12					
							41.96		21.09		2.83					
TOTAL																
	33.57				2098.99		1231.95		366.73		130.31		96.55		68.93	

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

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TABLE A-7. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 1

STREAM Middlings

SUBSAMPLE 2B INITIAL WT. (GMS) 7973.8 OVEN DRY WT. (GMS) 4340.0

COMPONENT	Size Range (Inches)															
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS					1347.7		1108.8		302.9		93.3					
FE CANS																
FE. NON CAN							3	22.5			1	2.67				
							151.1				2.76					
AL CANS					9	164.8	3	4.9	1	1.20						
					171.2		11.35		1.73							
AL. OTHER					8	97.3	10	54.0	1	0.54						
					173.4		74.9		0.56							
OTHER NON FE																
GLASS							11	334.6	39	198	73	66.96				
							334.6		198.8		67.23					
STONE AND CERAMIC							2		6		27					
							37.7		20.10		28.45					
TOTAL					1692.30		1727.45		524.09		191.74		111.55		90.10	

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

TABLE A-8. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 2

STREAM Overs

SUbSAMPLE _____ INITIAL WT. (GMS) 5157.4 OVEN DRY WT. (GMS) 1456.5

COMPONENT	Size Range (Inches)															
	+5 +4		+5 -4*		-4 +2		-2 +1		-1 +1/2		-1/2 +1/4		-1/4+No.20		-No.20	
ORGANICS	27		1		28		11		25							
	1459.0		57.6		795.4		99.0		172.4		6.0		10.46			
FE CANS																
FE. NON CAN							6	13.25								
							689.1						0.72		0.10	
AL CANS					2	39.26										
					40.4											
AL. OTHER					1	5.96										
					25.8											
OTHER NON FE																
GLASS									7	25.2	37	35.5				
									25.2		35.6		0.08			
STONE AND CERAMIC											1					
											0.9		2.40			
TOTAL																
	1459.0		57.6		861.6		788.1		197.6		42.5		21.66		1.25	

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

TABLE A-9. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 2

STREAM Middlings

SUBSAMPLE 1A INITIAL WT. (GMS) 13404.6 OVEN DRY WT. (GMS) 6590.0

COMPONENT	Size Range (Inches)																	
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS																
FE CANS																
FE. NON CAN																
AL CANS					13	219.0	2	8.5								
					229.5		8.7									
AL. OTHER																
OTHER NON FE																
GLASS																
STONE AND CERAMIC																
TOTAL					229.5		8.7									

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

TABLE A-10. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 2

STREAM Middlings

SUBSAMPLE 1B INITIAL WT. (GMS) 11708.1 OVEN DRY WT. (GMS) 5650.0

COMPONENT	Size Range (Inches)																					
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS					1788.9		1615.4		163.3		102.04		122.1			
FE CANS					7	94.35	1	8.12	1	2.09						
					123.7		8.3		2.25							
FE. NON CAN					1	29.69					1	1.30				
					131.7						5.48		1.28			
AL CANS					9	162.5	1	5.87								
					173.9		6.17									
AL. OTHER					2	12.2	16	148.6								
					18.1		182.4									
OTHER NON FE									1	11.42						
									16.56							
GLASS					1	77.87	13	417.7	34	136.5	100	82.93				
					78.2		423.1		137.36		83.29		39.47			
STONE AND CERAMIC							2		1		6					
							283.4		6.36		2.78		7.15			
TOTAL																
					2314.50		2518.77		325.83		193.59		170.0		125.14	

*Square holes. See Section 3, Coarse Screening, for explanation

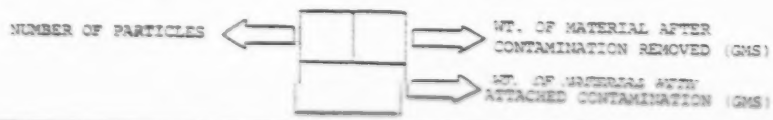

TABLE A-11. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 2

STREAM Middlings

SUBSAMPLE 2A INITIAL WT. (GMS) 10658.4 OVEN DRY WT. (GMS) 5100.0

COMPONENT	Size Range (Inches)																	
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS																		
FE CANS																		
FE, NON CAN																		
AL CANS					18	314.7	2	6.55										
					319.06		6.64											
AL, OTHER																		
OTHER NON FE																		
GLASS																		
STONE AND CERAMIC																		
TOTAL					319.06		6.64											

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

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TABLE A-12. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 2

STREAM Middlings

SUbSAMPLE 2B INITIAL WT. (GMS) 10688.9 OVEN DRY WT. (GMS) 5260.0

COMPONENT	Size Range (Inches) +5 +4	+5 -4*	-4 +2	-2 +1	-1 +1/2	-1/2 +1/4	-1/4+No.20	-No.20
ORGANICS			1533.6	1299.94	614.7	91.8	160.20	
FE CANS			1 12.99	3 24.66	1 2.14			
			15.6	26.67	2.40			
FE, NON CAN			2 5.00	3 12.84	2 1.19			
			112.33	149.30	1.22		0.51	
AL CANS			17 308.2					
			336.0					
AL, OTHER			1 4.70	12 97.84	5 7.76			
			6.63	163.00	11.95			
OTHER NON FE				1 33.64				
				34.45				
GLASS				5 345.25	31 127.18	76 61.77		
				145.56	127.42	62.25	27.11	
STONE AND CERAMIC				6	1	6		
				209.22	1.30	2.76	6.19	
TOTAL			2004.16	2028.14	758.99	156.81	194.1	121.59

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

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TABLE A-13. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 2

STREAM Unders

SUbSAMPLE 1A1A INITIAL WT. (GMS) 7343.6 OVEN DRY WT. (GMS) 4360.0

COMPONENT	Size Range (Inches)																	
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS							108.1		176.6		164.6		251.98			
FE CANS							3	9.97	8	16.08						
							12.53		19.18							
FE, NON CAN							1	8.37	1	18.97	4	2.79				
							12.55		19.22		2.92		23.07			
AL CANS							1	4.58								
							4.73									
AL, OTHER							5	9.59	9	4.26	6	4.96				
							13.27		4.32		5.12		0.08			
OTHER NON FE									2	15.97	1	0.90				
									20.41		0.89		0.08			
GLASS							17	266.1	370	553.5		568.0				
							271.24		1562.2		1571.7		465.07			
STONE AND CERAMIC							1		24		105					
							41.34		110.21		91.41		93.72			
TOTAL							463.76		1912.14		1837.17		834.00		308.08	

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⟸ | | ⟹ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

| | ⟹ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

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TABLE A-14. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 2

STREAM Unders

SUBSAMPLE 2A1A INITIAL WT. (GMS) 7353.8 OVEN DRY WT. (GMS) 5210.0

COMPONENT	Size Range (Inches)					
	+5 +4	+5 -4*	-4 +2	-2 +1	-1 +1/2	-1/2 +1/4	-1/4+No.20	-No.20
ORGANICS				59.20	188.80	142.60	254.82	
FE CANS					5 10.14 11.30			
FE, NON CAN					5 37.80 69.10	2 0.97 1.07	3.30	
AL CANS								
AL, OTHER				3 10.51 24.00	7 4.01 13.23	7 0.39 0.62	1.60	
OTHER NON FE								
GLASS				11 205.40 212.25	447 1449.2 14455.20	1951 569.50 1577.30	569.69	
STONE AND CERAMIC				2 39.79	9 49.88	124 91.14	96.07	
TOTAL				328.94	1787.51	1812.73	927.48	350.77

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

BOTTOM OF IMAGE AREA OUTSIDE DIMENSION FOR TABLES AND ILLUSTRATIONS

TABLE A-15. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 3

STREAM Overs

SUBSAMPLE _____ INITIAL WT. (GMS) 4317.4 OVEN DRY WT. (GMS) 2625.0

COMPONENT	Size Range (Inches)															
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS	22	1393.8	2	57.5	22	901.1	11	63.6	18	40.4		12.5		6.85		
FE CANS																
FE, NON CAN														0.06		0.07
AL CANS					1	19.64										
						20.0										
AL, OTHER																
OTHER NON FE											1	1.60				
												1.66				
GLASS							1	16.8	6	31.80	31	23.70				
								16.9				23.78		3.13		
STONE AND CERAMIC					1						2					
						56.1						1.86		0.72		
TOTAL	1391.8		57.5		977.2		80.5		72.11		39.80		10.76		0.07	

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⟸ [ ] ⟹ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⟹ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

TABLE A-16. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 3

STREAM Middlings

SUBSAMPLE 1A INITIAL WT. (GMS) 9139.7 OVEN DRY WT. (GMS) 4090.0

COMPONENT	Size Range (Inches)							
	+5 +4	+5 -4*	-4 +2	-2 +1	-1 +1/2	-1/2 +1/4	-1/4+No.20	-No.20
ORGANICS	225.1		903.8	1248.8	264.2	104.6	66.56	
FE CANS			3 31.58		1 1.85			
			52.90		2.00			
FE, NON CAN			1 0.39	6.62				
			5.85	92.94			10.47	
AL CANS			10 171.9					
			177.4					
AL, OTHER			3 28.10	11 92.28	4 2.28			
			57.24	114.47	3.80		0.11	
OTHER NON FE								
GLASS				11 177.0	40 60.45	56 49.05		
				177.47	161.40	49.17	12.88	
STONE AND CERAMIC			1	2	4	3		
			292.60	18.95	23.93	2.58	1.94	
TOTAL								
	225.1		1489.79	1652.63	455.33	156.35	91.96	48.16

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

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TABLE A-17. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 3

STREAM Middlings

SUBSAMPLE 1B INITIAL WT. (GMS) 8361.9 OVEN DRY WT. (GMS) 4170.0

COMPONENT	Size Range (Inches)																	
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS																
FE CANS																
FE, NON CAN																
AL CANS					11	203.2	2	20.58								
					226.2		25.40									
AL, OTHER																
OTHER NON FE																
GLASS																
STONE AND CERAMIC																
TOTAL					226.2		25.40									

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

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TABLE A-18. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 3

STREAM Middlings

SUbSAMPLE 2A INITIAL WT. (GMS) 8672.6 OVEN DRY WT. (GMS) 4360.0

COMPONENT	Size Range (Inches)																			
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS					1254.3		1460.1		284.8		67.15		73.76			
FE CANS					4	35.77	2	7.15								
					111.6		21.46									
FE, NON CAN							6	23.38	1	0.39						
							194.1		4.55				0.12			
AL CANS					16	287.9										
					297.0											
AL, OTHER					8	79.13	7	30.97	5	3.66	2	0.23				
					187.9		44.96		4.05		0.27		0.12			
OTHER NON FE									1	1.14						
									1.65				4.46			
GLASS					1	52.93	10	125.90	14	50.88	3	34.17				
					52.95		126.93		51.00		34.17		7.18			
STONE AND CERAMIC									3		6					
									16.98		2.39		1.24			
TOTAL					1868.05		1846.75		363.98		103.98		86.88		88.01	

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

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TABLE A-19. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 3

STREAM Unders

SUBSAMPLE 2A2 INITIAL WT. (GMS) 9091.9 OVEN DRY WT. (GMS) 6200.0

COMPONENT	Size Range (Inches)																	
	+5	+4	+5	-4*	-4	+2	-2	+1	-1	+1/2	-1/2	+1/4	-1/4+No.20		-No.20	
ORGANICS																
							112.53		178.27		190.4		281.82			
FE CANS							1	356	6	11.90						
								21.98		13.26						
FE, NON CAN											6	10.57				
												12.10		8.93		
AL CANS																
AL, OTHER							4	11.15	10	12.85	5	0.95				
								53.80		14.95		1.21				
OTHER NON FE									2	7.25						
										7.9						
GLASS							24	281.45	579	2067	2156	10085				
								287.85		2072.63		1813.9		537.32		
STONE AND CERAMIC									21		116					
										110.57		72.1		54.24		
TOTAL																
							476.05		2398.28		2089.71		884.31		354.39	

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⟸ | | ⟹ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

⟹ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

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TABLE A-20. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 3

STREAM Middlings

SUBSAMPLE 2B INITIAL WT. (GMS) 9400.8 OVEN DRY WT. (GMS) 3910.0

COMPONENT	Size Range (Inches)							
	+5 +4	+5 -4*	-4 +2	-2 +1	-1 +1/2	-1/2 +1/4	-1/4+No.20	-No.20
ORGANICS								
FE CANS								
FE. NON CAN								
AL CANS			10 180.7					
			189.8					
AL. OTHER								
OTHER NON FE								
GLASS								
STONE AND CERAMIC								
TOTAL			189.8					

*Square holes. See Section 1, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

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TABLE A-21. COMPOSITION/PARTICLE SIZE DISTRIBUTION

RUN 3

STREAM Unders

SUbSAMPLE 2B1 INITIAL WT. (GMS) 9127.7 OVEN DRY WT. (GMS) 6600.0

COMPONENT	Size Range (Inches)																					
	-5 +4		-5 -4*		-4 +2		-2 +1		-1 +1/2		-1/2 +1/4		-1/4+No.20		-No.20	
ORGANICS							140.93		153.02		186.1		307.60			
FE CANS									3	6.16						
									6.85							
FE, NON CAN								3.07	1	0.43	3	2.30				
							26.05		1.95		2.30		4.15			
AL CANS																
AL, OTHER							6	18.95	4	2.16	2	0.05				
							26.16		1.00		0.10		0.55			
OTHER NON FE							1	3.00	4	9.52	2	7.32				
							5.9		9.60		7.40		0.37			
GLASS							31	415.5	609	2157	2174	1863.8				
							430.3		2163.5		1869.2		574.65			
STONE AND CERAMIC							3	74.68	28		117					
							75.12		94.55		73.8		67.81			
TOTAL																
							704.66		2432.47		2138.9		955.13		365.76	

*Square holes. See Section 3, Coarse Screening, for explanation

NUMBER OF PARTICLES ⇐ [ ] ⇒ WT. OF MATERIAL AFTER CONTAMINATION REMOVED (GMS)

[ ] ⇒ WT. OF MATERIAL WITH ATTACHED CONTAMINATION (GMS)

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